Nudging Education – The (Potential) Role of Decision Architectures in Improving Educational Settings

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Abstract: Schools and other educational settings are entities in which countless decisions are made every day. These decisions involve an abundance of potential choices ranging from food choices in cafeterias, course selections, the consumption of tobacco with peers, or the question to even attend school or not. While researchers and practitioners alike are well aware of the fact that our choices are influenced by external factors (i.e. peer pressure), very little research has been dedicated to the systematization and improvement of these external factors. This paper presents a concept called "Nudging", which considers the plethora of externalities which constitute the decision architecture, and aims at the improvement of these. Nudging is grounded in empirical, psychological research and tries to create scenarios in which impulsive and unreflective decision-making results in better, not worse, decisions; by carefully constructing positive decision architecture, nudging tries to make it easy for people to do the *right* thing. This paper tries to bridge the gap between the already existing literature on nudging and the educational sector by presenting the concept as such and then presenting two case studies in which nudges have been used to improve decisions and behaviors.

Key Words: Nudging, Nudge, Prospect Theory, Decision Architectures, Schools, Improvement

1. Introduction

The study of human behaviors and decisions has been at the very core of psychology ever since. In this field of study, incentives, motivations, behavioral patterns, and the influence of externalities have been observed and different schools of thought have provided alternating explanations. Historically speaking, psychology and psychologists first focused on deviant and often extreme behaviors, such as torture (cf. Zimbardo 2008) or murder (cf. Grossman 2009) and tried to explain how human beings are able to commit such atrocities. Most studies and scholars agree on the fact that a significant amount of individual decisions and behaviors is situational and tremendously influenced by multiple social and environmental factors (cf. ibid.). Over time, an emerging amount of literature started focusing on decision-making in less extreme situations. From the late 1960s onwards, a paradigm shift in decision-making theory could be observed from a rational choice perspective (cf. von Neumann/Morgenstern 1944) to a psychologically informed, descriptive approach which was based on the works of Amos Tversky, Daniel Kahneman, Paul Slovic, Richard

Thaler, and others – Kahneman (2002) and Thaler (2017) were awarded Nobel Prizes in economics for their contributions to the field which should later be known as behavioral economics.

Prior to the paradigm shift, it was assumed that human beings act rationally and make decisions solely based on probabilities, their preferences, the idea of expected utility, and the maximization thereof, "which is grossly inadequate as a descriptive model of individual choice behavior "(Tversky 1975, 163). Even though plenty of observable deviances from rational choice theory existed, the normative rational choice approach – it prescribed how people were supposed to act instead of how they actually acted – remained the gold standard until the late 1960s. The history of science argues in these cases that dominant theories are rarely replaced when they have been refuted but rather when an alternative to the refuted theory exists (cf. Lakatos 1976; cf. Kuhn 1969/1973). Nonetheless, due to its omni-presence, rational choice theory shaped a plethora of institutions, procedures, and measures. Due to the works of the aforementioned psychologists, decision-making theory developed from rational choice theory to Prospect Theory – a neologism which serves as an umbrella term for all phenomena existing in descriptive, psychological research on decision-making (cf. Kahneman/Tversky 1977). Prospect Theory treated the observable deviances from rational choice theory differently as "deviations of actual behavior from normative models are too widespread to be ignored, too systematic to be dismissed as random error, and too fundamental to be accommodated by relaxing the normative system" (Tversky/Kahneman 1986, 3). Therefore, Prospect Theory describes how people actually act in different situations and tries to identify and isolate variables which cause these observable irrational behaviors. With the introduction of Prospect Theory, it was made possible to modify decision-making scenarios aiming at certain actions, behaviors, and decisions to be preferred over others. The insights of Prospect Theory were later enriched by studies and results from social psychology, sociology, and socio-linguistics providing a toolbox to influence decision-making. This toolbox – all aspects contributing to the "decision architecture" – is called nudging, first being conceptualized by Richard Thaler and Cass Sunstein in their best-selling book *Nudge* (2017).

Nudging became a simple, cheap, and effective tool to improve decision-making of individuals and institutions alike. In 2002, Great Britain's government established a consulting entity called the *Behavioral Insights Team*, sometimes referred to as the Nudge Unit; the Nudge Unit provided more than 100 nudges for state and local authorities and also consults multiple governments abroad (cf. Straßheim/Jung/Korinek 2015) turning nudges into a globally applicable system. While some

sectors – i.e. economy, public health, medicine etc. – absorbed the insights from the above described paradigm shift rather fast, other fields act less informed. One such field is the educational sector (for a comprehensive overview on nudging in the educational sector see Damgaard/Nielsen 2018). Even though countless education-related decisions are made every day, most state-run educational institutions neglect the impact decision architectures have on the behaviors, choices, and ultimately life paths of parents, children, teachers, and students – often resulting in unsatisfactory and subpar results.

This paper aims at bridging the gap dividing nudge theory and the educational sector. Therefore, nudge theory and the attached philosophy of liberal paternalism will be outlined in the first section of this paper. After having presented the core aspects of nudge theory, two examples of successfully applied and researched nudges from the educational sector will be presented and contextualized by highlighting the underlying psychological processes. The final section of the paper will discuss the potential of nudge theory to improve educational settings while considering limitations and potential dangers.

2. What is Nudge Theory?

Prospect Theory, as one of the core constituents of nudge theory, does not negate rationality as the modus operandi in human beings. However, it treats deviances from rationality differently. While rational choice approaches assume that deviances from rationality can be explained by mental overload, a lack of calculating capacity, or an imperfect information scenario, Prospect Theory recognized patterns in the – sometimes irrational – decisions human beings make. Subsequently, proponents of Prospect Theory were able to identify scenarios in which certain heuristics – mental shortcuts (mis-)used in decisions under uncertainty and which can result in irrational behavior – were applied by test subjects.

Due to the vast amount of decisions each and every human being has to make every day, human beings apply shortcuts/heuristics to ease and accelerate the decision-making process; the oldest and most stable of these heuristics are of evolutionary origin, others were learned or are contextual. Daniel Kahneman (cf. 2012) differentiates between system 1 (fast thinking) and system 2 (slow thinking) while Richard Thaler and Cass Sunstein differentiate between *Humans* and *Econs* (cf. 2017, 34). System 1/*Humans* mostly decides intuitively by applying heuristics and shortcuts, system 2/*Econs* considers more information, reflects more deeply, and invests more throughout analysis

into the decision-making process (cf. Kahneman 2012; Thaler/Sunstein2017, 34). Most of the time, splitting decision-making in such a way serves human beings well. However, the division of decision-making into system 1/*Humans* and system 2/*Econs* can be exploited if a system 2/*Econ* problem – requiring in-depth thought, analysis, and reflection – is treated like a system 1/*Human* question – the overgeneralization/overuse of these shortcuts is one of the core elements of Prospect Theory and nudging.

Such mental shortcuts may mislead humans by the presentation of the scenario itself. In a study on decision-making in the medical sector, it was shown that subjects decide differently whether or not to administer a treatment depending on the presentation of the available data. The treatment was presented with an attached mortality rate, the other time with the corresponding survival rate (cf. McNeil et al. 1982). While numerically describing the same circumstances, the decisions of naïve (patients) but also of sophisticated (physicians) test subject "were influenced by several variations in the nature of the data and the form in which they were presented" (McNeil et al. 1982, 1262) – a clear violation of rational choice principles which established itself in the literature as the *framing effect* (Tversky/Kahneman 1979: 3/4). Some of these effects are already well known by scholars and practitioners alike, such as the *halo effect* in which an overgeneralization based on a (n often well visible) trait takes places – a pars pro toto error – or the *recency effect* in which experiences, grades, performances, or impressions which are, due to their temporal proximity or substantiality, easier to retrieve contribute stronger to an evaluation of a student, situation, or group than impressions which are harder to remember/retrieve. Other phenomena, such as the *anchoring effect* (cf. Tversky/Kahneman 1974: 1128/1129), *loss aversion* (cf. Tversky/Kahneman 1981: 454/455) or the *endowment effect* (cf. Kahneman/Knetsch/Thaler 1990; 1991) went largely unnoticed by the educational sector hinting at the potential for growth by constructing a more conscious decision architecture. While teachers, students, and scholars were aware of the fact that human perception and decision-making are flawed and decisions are often contextual in their nature, Prospect Theory can help educators to create better decision scenarios while nudging allows us to theorize them and thereby make them usable for the educational setting.

However, decisions are not just influenced by the perception of the world but also by the social environment of the decision-makers. Especially in decisions under uncertainty, the influence exercised by authority figures, peer groups, or people with a high degree of likeability is enormous (cf. Cialdini 1999; Cialdini/Schultz 2004). Nudging considers these aspects derived from social

psychology, sociology, and socio-linguistics and uses them as non-monetary incentives to facilitate *good* decisions. All aspects mentioned above – and a plethora more – constitute the decision architecture. A decision architecture is the imagined space in which decisions are made; due to its neuro-spatial limitations – human beings cannot consider all aspects of decisions – only a certain amount of information, insights, experiences, references, or cues is present in a decision architecture and thereby considered by the decision maker. Daniel Kahneman named this the *What You See Is All There Is* (WYSIATI) rule describing the human tendency to mistake their perception of the world with the actual world (cf. Kahneman 2012, 115) often resulting in irrational decisions; nudging is the attempt to actively modify the WYSIATI aiming at more beneficial outcomes.

With the help of the aforementioned tools and mechanisms, nudging aims at "alter[ing] people's behaviors in a predictable way without forbidding any options or significantly changing their economic incentives" (Thaler/Sunstein 2017, 15). Taking the existence of decision architectures as a given, a completely neutral or unbiased decisions become an illusion as decision architectures are always, sometimes consciously mostly unconsciously, constructed. While decision architectures can be (ab)used to increase sales or direct attention towards certain products (cf. Harford 2007, 40), nudging suggests to construct decision architecture more consciously and carefully making it easy for people to due the *right* thing. Following this line of reasoning, nudging primarily modifies the decision-makers' perception of the world and the references, frames, and shortcuts s/he consults in the decision-making process, which explains why nudges are comparatively cheap to install and realize (cf. Thaler/Sunstein 2017, 19). Nudges never subsidize or forbid a certain decision and thereby leave the decision scenario intact; or as Sunstein/Thaler (2017, 15) phrase it: "Putting fruit at eye level counts as a nudge. Banning junk food does not." In order to qualify as a nudge, the applied measure has to be cheap, working with a non-monetary incentive, and must be easy to avoid. The opposite of nudges – decision architecture which eliminate options by being hyper-complex and hard to avoid – are sometimes referred to as "sludges" (cf. Thaler 2018, 431).

2.1. Liberal Paternalism

Even though nudges are cost-effective and realizable without the disruption of an already established system or procedure, the modification of decision architectures is a hyper potent-mean to alter behavior and make certain decisions more likely. This even holds true for particular delicate areas of life, such as the donation of organs. The change of the default setting – in one case people had to actively decide to donate organs (Germany), in the other (Austria) they had to actively object

against being an organ donor – resulted in a significant difference between the two countries (cf. Johnson/Goldstein 2003: 1338/1339; Dobelli 2012, 130). Such hyper-potent means of manipulation require an ethical rulebook to define and legitimize aims, goals, and scope of nudges. Richard Thaler and Cass Sunstein attempted to create guidelines by introducing the concept of *liberal paternalism* (cf. 2017, 14/15). Liberal paternalism may be an oxymoron on paper; however, it could also be considered the third way between the extremes of either completely *laissez-faire* or overregulated decision scenarios. The paternalistic elements of nudging come from the fact that they can be considered top-down approaches as they are installed by authorities (cf. French 2011, 157) with a clear and defined aim. From the paternalistic perspective is assumed that people would choose differently if they had the mental resources and knowledge to analyze and conceptualize their position and aims properly but do not choose to do so as they are inhibited by structures, guidelines, procedures, or information asymmetries (cf. Thaler/Sunstein 2017, 15). On the contrary, nudges also promote liberal ideas as nudges are supposed to be passive, positive, avoidable and voluntary (cf. French 2011, 157). Passive means that they change the decision architecture, not the decision itself as freedom of choice is still intact. Avoidable and voluntary describe the idea that no option has been canceled. This means that if junk food, smoking, not donating organs, or eating copious amounts of candy is the preferred choice of an individual, it can still be realized without having to spend more time or effort. In the case of nudging, *positive* refers to an increase in general welfare; the problem with this kind of reasoning is that something as complex as general welfare is considered to exist. While health could be promoted by putting low-calorie food items in well-visible places, it could also be argued that the missing sales from sugary and/or high-fat items decreases the welfare of the retailer. Depending on the analysis' scope, welfare becomes too abstract to provide a meaningful guidance for nudging. Due to the overabundance of different definitions and possible realizations of welfare, it can no longer be anticipated by decision architects (Vallgarda 2012, 202). On the contrary, it could be argued that the current preferences people pursue are only realizations of the decision architecture in place. Sunstein and Thaler (2003, 1161) on the issue:

> "Our emphasis is on the fact that in many domains, people lack clear, stable, or well-ordered preferences. What they choose is strongly influenced by details of the context in which they make their choice, for example default rules, framing effects (that is, the wording of possible options), and starting points. These contextual influences render the very meaning of the term 'preferences' unclear."

The questions of free choice, (actual) preferences, and public as well as individual welfare are unlikely to be answered any time in the future. However, the tools known as nudging are available,

well-researched, and known by various actors. Therefore, ignoring these insights is no longer an option. Due to the powerful results of nudging as well as the moral issues outlined above, nudging – initiated by state actors – has mostly been realized in uncontroversial areas and primarily focused on improving the situation of the individual, such as the promotion of health, the avoidance of waste/pollution, or the prevention of errors.

3. Nudging Education – Two Case Studies

Nudges are powerful tools to alter behavior. In the areas of child-related work and institutions, nudges and their implications need to be reflected with even more consciousness as children and young adults are more prone to external influences. Simultaneously, children and young adults do not have full control over their lives as it is assumed that they cannot adequately foresee the implications and long-term effects of their actions, lack self-control, and attention and thereby need to be protected from potential dangers until they are mature enough to fully decide for themselves. This ambiguity makes nudging in the educational sector even more demanding for the decision architects. For the illustration of the two case studies of successful nudging, relatively uncontroversial scenarios and aims have been chosen in order to highlight the applied mechanisms.

3.1. Data Doesn't Speak, Comparisons Do

The first nudge being presented in this section tackles an issue in which society and law-makers have a relatively specific and uncontroversial position: Children's and young adults' duty to attend school. With the exception of home schooling or long-term (often health related) absence, children and young adults are expected to attend school regularly. However, due to a plethora of reasons and motivations, there is a population of students which actively avoids visiting school – a phenomenon called absenteeism. Even though no single definition of absenteeism exists (cf. Hillenbruch/Vierbuden/Hagen 2012, 23) – different scholars draw the line at varying time spans –, it is assumed that five to 50% of all students actively avoid school in their lives as students (Ricking/Schulze/Wittrock 2009, 22). While the majority of these five to 50% only avoids single periods or lessons and eventually returns to structured and regular attendance, there is a sub-population which piles up missed days which often results in poorer grades, failing classes, having to repeat a year, or – the worst-case scenario – ending as a drop-out without a degree (cf. ibid); dropping out significantly raises the probability for a failing careers, a tendency towards crime and criminal behavior, and ultimately disintegration from society. Considering these aspects, it can be

argued that nudging children and young adults towards school attendance is a worthwhile and widely accepted aim, which improves society's as well as individual welfare.

In most places, parents receive a message from the responsible administrative entity if their child has missed a certain amount of school days and did not provide a valid excuse. This message targets the parents or caretakers and tries to raise awareness for their child's absenteeism. However, depending on the presentation of the message's content, parent's reactions and ultimately their children's absenteeism differ. A study tested the impact different forms of presentation have on the responses from parents. "Parents of 28,080 high-risk Kindergarten through 12th grade students received one of three personalized information treatments repeatedly throughout the school year or received no additional communication (control group)" (Rogers/Feller 2018, 1). In the first version, the parents were informed about their child's absenteeism and encouraged to look after their child, the second consisted of a detailed history of their child's missed days, and the third had the detailed history but also added the missed days of an average student as a comparison. The most effect version – detailed history plus comparison with average students – reduced absenteeism in the researched group of more than 10% (cf. ibid.) and outperformed the alternative letters; a very effective nudge based on the social proof principle sometimes also referred to as the herd mentality.

Being informed about a child's absenteeism creates a scenario of uncertainty for most parents. Parents often do not know how to evaluate a child's absenteeism in terms of seriousness and scope. In order to assess the degree of seriousness accordingly, numbers alone do not help as a reference group is needed. By comparing the child in question with an average student, the amount of missed days/lessons is put into perspective and reinforces the parent's call for action. However, the herd mentality goes a step further. Historically speaking, belonging to the tribe, clan, or herd used to be one key factor for survival. As we are the descendants of the past's surviving population, it is assumed that belonging to the herd – nowadays often being replaced with the majority or average – is an incentive in itself (cf. Levitt/Dubner 2016, 117) as human beings, especially in situations of uncertainty, look for social proof. While these instincts helped our ancestors to survive and thereby became ingrained into human behavior, such automated and often unquestioned mechanism are prone to being exploited (cf. Cialdini 1999, 15). In this case study, the herd mentality – the desire to belong to the average – has been used to raise awareness in parents about their children's absenteeism. The incredibly complex question of 'Does my child's absenteeism require an intervention?' has been replaced with the much easier question of 'Is my child exhibiting average

behavior?'. The first question requires reflection on the child's countless idiosyncrasies considering and balancing a plethora of factors – a task designed for system 2 or *Econ* thinking – while the second question can be answered relatively quick and adequate – a mental shortcut provided by the mode of presentation. Due to this contextualization, the call for action directed at the parents or caretakers is relatively unambiguous and results in higher response rates and ultimately less absenteeism.

This nudge – while being measured against other scenario and a comparable control group – caused a 10% betterment. This may not be enough to consider the problem of absenteeism solved; however, it highlights the potential of intelligent modifications of decision architectures. No additional resources – neither monetary, social, nor staff-wise – have been used and still, just through conscious presentation of the problem, a 10% betterment could be achieved. Also, no procedures have been changed and no additional effort has been created for the executing authorities. The herd mentality/social proof nudge could serve as a non-invasive, voluntary, and passive way to – just to name a few potential application – promote a healthy lifestyle, prevent the consumption of drugs or smoking, or limit other deviant and destructive tendencies in children and young adults. Simultaneously, the herd mentality nudge allows enough freedom to still follow the opposite direction in case that the item in question is of utterly importance for the child's or young adult's identity, group belonging, or well-being.

3.2. How to Improve Test Scores

It could be assumed that gains and losses are evaluated equally; the loss of a unit matters numerically as much as the gain of the same unit. Tversky and Kahneman (cf. 1991; 1992) found out that this is not the case. Losses are considered twice as bad compared to the gaining of a comparable unit – losing $1 has a negative impact equally in size as winning $2. The mental bookkeeping applied for gains and losses clearly violates the rules of rational choice theory. This empirically observable loss aversion has widespread implications for multiple areas of life as people being affected by potential losses invest much more time and effort in order to not be affected by losses; this can be considered one reason why political reforms in which few people lose while a significantly larger amount of people gain, often fail. Loss aversion motivates the potential losers to a higher degree than it can motivate the potential winners of a reform and thereby favors the conservation of the status quo (cf. Kahneman 2012, 375). Evolutionary speaking, this loss-aversion can be explained by the fact that losses threatened mankind's survival much more than potential

gains could guarantee future survival. This conservative bias has survived until the very day and shapes individual as well as collective decisions significantly.

While most people respond to losses more resolute than to gains, this tendency can also be exploited for good. Loss aversion can be used to improve students' performance in tests and examinations. Instead of starting at 0% and gaining points for each correctly answered question, the scenario could also be turned around: the student starts at 100% and lose points for incorrect answers. The testing format, the content of the tests and examinations, and the required level of accuracy remain the same. Also, the change of the scenario does not create additional effort for the teaching staff, neither in preparation nor for the assessment of the tests. While this change in counting points does not seem to make a difference from a purely analytical, rational perspective, it has been shown that performance differs depending on the presentation of the test. Smith et al. (2018) has shown that the loss group outperforms the gain group by three to four percent. McEvoy (2016) could also detect better performance in loss-aversive settings while Apostolova-Mihaylova et al. (2015) could only find higher performance in male students when the scenario was framed as loss-aversive. Considering that this nudge does not require any additional resources nor a change in the grading procedure itself, a betterment of three to four percent is a result which seems to be realizable by all institutions and teaching staff.

While the work on loss-aversion and testing is preliminary and requires further studies and investigations in the future, it hints at the potential to improve student scores. Improvement in student performance may be relevant for teachers and institutions; however, it should also be in the interest of the student to deliver his/her best performance possible, especially in testing situations which are relevant for later school choice or serve as the basis for diploma scores and/or future job applications. The simple nudge of designing loss-aversive scenarios instead of gain-oriented ones, seems to activate extra mental resources, attention, and motivation resulting in a small, yet significant, increase in testing scores which illustrates the students' performance more adequately than traditional testing formats.

4. Potentials and Dangers of Nudge Theory for the Educational Sector

Scientific approaches do not promise to solve problems completely; they suggest a small, yet steady, improvement of the status quo (cf. Hariri 2019, 284). Nudging clearly falls into this category as the discussed improvements – being exemplary for most nudges – range between five and 20%

compared to control groups. Considering that nudges do not require extra resources, a betterment in this range can be considered a success and it would be a sin of omission to not make use of these possible improvements. However, nudging needs to be realized with a certain degree of reflection and introspection. Cass Sunstein himself – at the time advisor for the Obama administration – vividly illustrated the dark side of nudging when he suggested to use bots in social networks to flood social media with certain ideas while ridiculing others – a digital realization of the herd mentality nudge (cf. Sunstein/Vermeule 2008); the aftermath of this idea is discussed until the very day and governments blame one another for election meddling of this kind. While this may be a drastic example, it illustrates the power intelligently realized nudges can unfold. With this kind of power and impact, the construction of decision architectures and the application of nudges needs to be constantly reviewed, reflected, and if necessary modified. This becomes particular evident when discussing the use of nudges in educational settings exposing minors, children, and young adults to the nudges in question. On the contrary, it should be considered that children and young adults are exposed to nudges every time they enter a supermarket, take a look at their social media presences, purchase an item online as well as offline, or look at and apply for higher education programs and institutions. As stated in the introduction, nudging is a tool – with the potential for good and bad, depending on who is using it – and should be treated as such. Of course, nudging and its dangers must be discussed in public as well as in classrooms; however, this should not inhibit educators and scholars to think about, reflect on, and ultimately design decision architectures aiming at the improvement of parents', children's, teachers', and students' choices in order to help them live a more successful, healthy, fulfilling, and conscious life.

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